

REMARKS

Reconsideration and allowance of this application are respectfully requested in view of the amendments and the discussion below.

Applicants' invention is addressed to display control device with an actuating element which is able to rotate about a longitudinal axis and to move an longitudinal direction of the axis. According to the present invention additional movement is provided for the actuating element. This additional movement is indicated by the arrows in the figures. The purpose of this movement is to allow for the selection of the fields arranged in the outside or marginal region of the display screen and associated with a point of a menu structure on the display screen. The rotary movement as well as the longitudinal movement of the actuating element enables a subordinate field of the menu structure associated with the field and the marginal region to be selected in the central region of the display screen. More specifically, in the embodiment shown in the figures, one of the eight memory items is selected by the "additional movement" in the direction of the arrow by the actuating element 4. Once a defined extent is exceeded in the direction of the arrow 4, the "audio" menu is selected. Once the actuating element is released it returns to its initial position and at the same time subordinate menu points assigned to menu points 4 appear in the central region. In a particular example, stations are listed with the first station being optically highlighted.

If it is desired to select another listed station the actual element is turned about its longitudinal axis and the selection is then made by moving the button in the longitudinal direction.

Claims 1-8 have been rejected under 35 U.S.C. §112, second paragraph, as being indefinite and claims 5, 6, 7 and 8 have been objected to as being in improper form. In response to this rejection Applicants have cancelled original claims 1-8 and added new claims 9-16 which meet the requirements of 35 U.S.C. §112 by providing proper antecedent basis and a standard format for apparatus claims.

Original claims 1-6 were also rejected under 35 U.S.C. §102 as anticipated by the reference to Macor, U.S. Patent No. 5, 841,849, for the reasons indicated at item 11 from the bottom of page 6 to page 7 of the Patent Office Action.

In response to this rejection, Applicants submit that newly added independent claim 9, which corresponds to original claim 1, rewritten in a standard format, provides a structure which is not shown or disclosed by the reference to Macor.

Macor uses a portable cellular phone with a depressible track ball 22 to move the location indicator 25 and when the ball is depressed, a virtual function button is selected.

Contrary to the assertion of the rejection, there is no provision for "additional movement" in addition to rotary movement and longitudinal movement along the longitudinal axis. Aside from a lack of this mode of movement in Macor, Applicants

submit that the presently claimed invention provides a function for each movement. That is, the "additional movement" of the present invention allows for a selection of field in the marginal area of the display. The rotary movement allows for highlighting subordinate fields in the central region of the display and the longitudinal movement of the present invention allows the selection of the highlighted subordinate field. No such structure and related function are recited or disclosed in the reference to Macor which provides only two functions. There is no movement in Macor corresponding to the "additional movement" with two degrees of freedom.

In response to the objection to the specification because of the related informalities indicated at pages 2-5 of the Patent Office Action, Applicants are submitting herewith a marked-up specification as well as a clean copy of the substitute specification containing the required headings and arrangement of the specification. No new matter is introduced by these changes.

According to item 1 on page 2 of the Patent Office Action, the Information Disclosure Statement filed on August 2, fails to comply with the provisions of 37 C.F.R. §1.97 because copies of two references were not submitted.

Applicants respectfully traverse this rejection on the grounds that the present application is a U.S. National Stage of a PCT filed application and accordingly the purpose of submitting a list of references provided by the International Search Report is to ensure that these references would be listed on

the front of any issued U.S. patent. There is no obligation to submit copies because the search report and references are sent to the U.S. Patent Office as a designated country. Therefore, Applicants submit that the IDS Statement of August 2000 contain a list of references which must be considered.

Therefore in view of the distinguishing features between the claimed invention and the reference which features are not shown or disclosed or made obvious by the reference to Macor and in view of the changes to the specification and the claims to obviate the objections and rejections in the office action without adding any new matter, Applicants respectfully request that this application, containing claims 9-16 including independent claim 9, be allowed and passed to issue.

If there are any questions regarding this amendment or the application in general, a telephone call to the undersigned would be appreciated since this should expedite the prosecution of the application for all concerned.

If necessary to effect a timely response, this paper should be considered as a petition for an Extension of Time sufficient to effect a timely response, and please charge any deficiency in fees or credit any overpayments to Deposit Account No. 05-1323 (Docket #080437.48802US).

Respectfully submitted,

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JDS:adb

TITLE OF THE INVENTION

DEVICE FOR CONTROLLING A DISPLAY SCREEN WITH A ROTATABLE
ACTUATING ELEMENT

RECEIVED

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BACKGROUND AND SUMMARY OF THE INVENTION

Technology Center 2100

This application is a National Stage of PCT/EP9/07571 filed November 24, 1998 claims the priority of 19752056.1 and 19843421.9, filed November 25, 1997 and September 22, 1998, the disclosures of which are expressly incorporated by reference herein.

The invention relates to a device for controlling a display screen having a rotatable actuating element and moved to enable pointing to a menu structure ~~having the characteristics of the preamble of Claim 1.~~

A device of this type is known from European Patent Document EP 0 796 766 A2. In this case, the actuating element is used for increasing the number of planes within the menu structure. It is indicated for this purpose that the planes are to be arranged to be distributed along the circumference of the display screen. This type of a device represents an additional difficulty for the user because there is ~~he finds~~ no clear assignment between the additional movement and the axial or rotational movement of the actuating element. The transition between the planes and within the menu structure also does not develop in a manner that is ~~clear to him~~ unclear and finally draws the user's attention away from the traffic situation.

It is an object of the invention to provide a device of the initially mentioned type in the case of which there is a clear assignment between the display screen and the various moving possibilities of the actuating element.

~~According to the invention, this object is achieved by means of the characteristics of Claim 1.~~

By means of the additional movement of the actuating element, an overriding point of the menu structure is now selected; by means of the rotary/longitudinal movement of the actuating element, a point of the menu structure is selected which is subordinate thereto. In concrete terms, this means, for example, that the possible menus are arranged in the marginal region, while the pertaining submenus or function or function values are situated in the central region. In this case, only the partial menus, the function and function values are arranged in the central region which are part of the one menu preferably selected by a preceding additional movement of the actuating element. Thus, the points which within the menu structure are disposed on the same step are situated in the marginal region, while the hierarchically lower points are ~~to be found~~ located in the central region.

As known ~~per se~~ from European Patent Document EP 0 796 766 A, the actuating element can carry out a wobbling as well as a parallel displacement as the additional movement and can also be forcibly guided during this movement. The moving possibilities and limitations improve the handling of and the movement within the menu structure. Starting from the central position as the initial position of the actuating element, the additional movement is synonymous with a leaving of

the plane of the menu structure indicated in the central region and the selecting of the next-higher plane. The return movement into the starting position, in turn, indicates the transition from the just found higher plane into the next plane situated underneath. As ~~the~~ a result, the user is provided with a tactile sense as to how he is moving within the menu structure.

An improvement of the invention relates to the problem of an operating error which may occur in the case of a device of this type. Particularly if a plurality of points are arranged within the frame region of the display screen, the risk of accidentally not "hitting" the desired point is particularly high. Another factor is the special situation in which the selection of these points takes place. The turning to the display screen frequently competes with the traffic situation. The time available for this purpose, as a rule, is very brief.

If the points arranged in the frame area are optically highlighted during and/or after the additional movement and are selected only when the actuating element is at least approximately back in the starting position, the danger of a faulty selection is largely avoided.

Although, by means of the additional movement, it is possible to optically select the point of the menu structure arranged in the frame area, the selection will functionally only take place when the actuating element is back in the starting position. When the device is used in a vehicle for controlling different menus, such as the navigation system, the vehicle computer, the air conditioner, etc. and the assignment of the points arranged in the frame area to the individual menus, the term "functional selection" means the following:

As a result of the additional movement of the actuating element, the section of the marginal region assigned to the respective menu is optically stressed, for example, highlighted. The selection and therefore the controlling of the respective menu, for example, of the navigation, will, however, take place only when, after the optical highlighting of the corresponding marginal region section, the actuating element is returned back into the starting position. Only then will the navigation system be selected, for example, for the vehicle computer, instead of the menu previously shown on the display screen. If, in this case, the partial menus and/or functions and/or function values are displayed as points (for example, in the form of rectangular fields) within the interior surface of the display screen surrounded by the frame region, these points can now be activated preferably by means of the actuating element.

The transition to another menu again requires the preparatory selection of the respective marginal region section by means of the actuating element, in conjunction with the optical highlighting of this section and the subsequent functional selection by returning the actuating element into the starting position.

Other objects, advantages and novel features of the present invention will become apparent from the following detailed description of the invention when considered in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

~~In the following, the~~ The invention is illustrated in the drawings ~~will be further explained by means of the drawing.~~

Figure 1 is a view of a display screen which is used within the scope of the device according to the invention;

Figure 2 is a view of the display screen of Figure 1 when controlled by an actuating element known from European Patent Document EP 0 796 766 A;

Figure 3 is a view of a further development of the device of Figures 1 and 2; and

Figures 4 and 5 are views of the method of operation of the device of Figure 3.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Figure 1 is a basic view of the display screen provided within the scope of the invention. A marginal region 2 and a central region 3 are situated within a display surface 1 which is identical to the picture surface of a display screen. Eight symbols for the menus to be controlled by means of an actuating element, which is not shown, are illustrated in the marginal region 2 at eight points which, with respect to the center point of the picture surface 1, are offset with respect to one another by approximately 45° respectively. These are the audio, navigation, television, parking air conditioner, etc. menus. "Adjustment" means "assigned to all adjustable

functions and function values". "Off" indicates the possibility of switching off the display screen.

One of the eight menu points can be selected by an additional movement (wobbling or parallel movement) of the actuating element (not shown). For this purpose, the actuating element must be moved in a direction symbolized by an arrow 4. Here, the "audio" menu point is selected. This selection takes place by moving the actuating element in the direction indicated by the arrow 4 by a distance or an angle which exceeds a defined extent. As a result, the "audio" menu point is selected.

After its release, the actuating element returns to its inoperative position under the effect of a restoring force. Simultaneously, the hierarchically subordinate menu points assigned to menu point 4 appear within the display surface 1. These are the transmitting stations fixedly programmed within a radio which is not shown. These are indicated in the central region. This is illustrated in Figure 2. One of the symbols, here, "antenna", is optically highlighted. This is the symbol of the station which was last selected. If the vehicle user carries out no further adjustments, this station remains tuned in.

If, on the other hand, he wants to change the station, he turns the actuating element about its longitudinal axis. This is a rotary push button, as known from European Patent Document EP 0 366 132 B1 and also described in European Patent Document EP 0 796 766A. In this case, one of the symbols assigned to the other stations, such as "classical", is optically highlighted instead of "antenna". The switching-over to this station takes place in

that the rotary push button is moved in the longitudinal direction. Under the effect of a restoring spring, it subsequently moves back into its starting position.

If a switch-over is to now take place to a function of another menu, for example of the BC = vehicle computer menu, the rotary push button must be swivelled in the direction indicated by the arrow BC or displaced parallel thereto. The swivelling is accompanied by the display of the different functions of the vehicle computer in the central region, replacing the station symbols illustrated in Figure 2. A vehicle computer function, such as the range, can be highlighted as a standard, or can be highlighted after a preparatory axial movement of the rotary push button. The selection of this function, that is, the display of the actual range of the vehicle, can then take place in that the rotary push button is optionally again moved axially. For example, in addition to the optically highlighted "range" symbol, the value of the range, for example, 225 km, will appear in the central region.

Immediately thereafter, a switch-over can take place to the navigation menu in that the additional movement of the rotary push button takes place in the direction of the "Navigation" arrow. The individual navigation parameters appear in the central region.

In this manner, it is possible to rapidly and securely switch between the individual menus, the partial menus, the function and the function values.

The further development of the invention illustrated by means of Figure 3 and on consists of not immediately triggering a function change during the translational displacement of the actuating element but of first only carrying out a stressing, for example, a highlighting, of the selected main menu point. As a result, a correction by the operator is still possible at this point in time. The actual triggering of the function takes place only when the spring-centered actuating element is released.

The user wants to call up the "Audio" function range. In the example of Figure 3, the "Navigation" menu point was accidentally selected instead of "Audio". If the pertaining submenu were to be called immediately, the user would be in the navigation menu.

In order to avoid this, the call-up of the respective submenu does not take place immediately at the time of the selection but only when the actuating element is released. In the example, the user recognizes by the stressing of "navigation" that the wrong menu point is selected and can push the actuating element toward the left to the desired "Audio" menu point. This is illustrated in Figure 4. Also now, the pertaining "Audio" menu is not yet activated.

Only by releasing the spring-centered actuating element will the call-up of the desired "Audio" submenu take place, as illustrated in Figure 5. Figure 5 differs from the situation illustrated in Figure 2 only to the extent that now the lettering of the activated menu in the frame remains optically highlighted.

The foregoing disclosure has been set forth merely to illustrate the invention and is not intended to be limiting. Since modifications of the disclosed embodiments incorporating the spirit and substance of the invention may occur to persons skilled in the art, the invention should be construed to include everything within the scope of the appended claims and equivalents thereof.